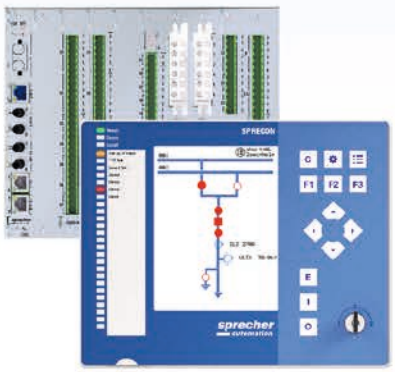


SPRECON®-E-P DD..6

Distance Protection

www.sprecher-automation.com

sprecher automation

INTRODUCTION

The distance protection acts as the main protection function. The devices include standardised hardware modules and firmware. They all provide protection functions of the same range.

The series consists of:

- SPRECON-E-P DD..6-1
  (Protection devices with control function)
- SPRECON-E-P DD..6-2
  (Modular protection and control devices)

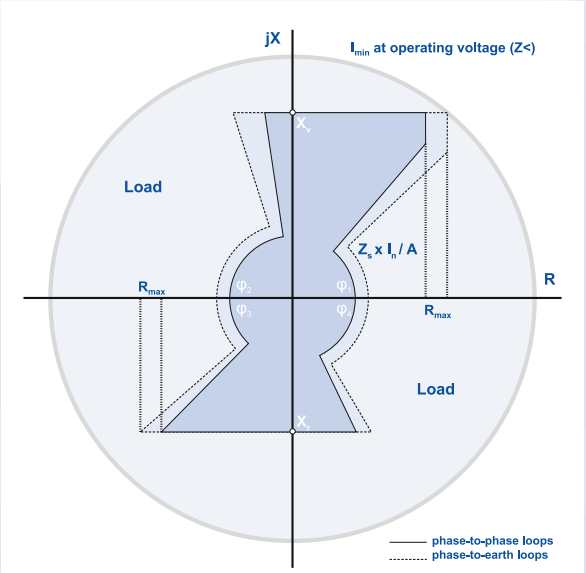
Modular one-box solutions show higher application flexibility than protection devices with control function. Protection devices with control function have a fixed range of in- and outputs. Beside protection and measured value collection, they also feature control of up to four switching devices. Due to its modular design, the one-box solution can be expanded easily for realising comprehensive protection, measurement, control and monitoring tasks in secondary systems.

The multifunctional SPRECON-E-P devices feature a clear separation of control and protection functions which allows either combined or separated operations of control and protection functions:

- Separated data models
- Separated control and protection firmware
- Separated control and protection configuration
- Separated passwords
- No testing of protection function at feeder nor primary circuit disconnection required on updating control parameters or firmware

RANGE OF FUNCTIONS

The devices are accentuated by a technologically fully developed and commercially optimised design. They allow realisations of sophisticated and compact solutions with clear economical benefits through highest possible flexibility and scalability.



Characteristic of polygonal impedance start (Z<)

APPLICATION

The SPRECON-E-P DD..6 devices are multifunctional devices for protection, control and automation of energy stations. They can be applied as main protection units of overhead power transmission lines and cables of all grids and neutral point connections at medium or high voltage levels. The device can also be used as backup protection for overhead lines or cables or as back-up protection for other primary systems such as transformers and busbars.

Control of the circuit breaker can act as a 1- or 3-pole automatic reclosing procedure. The devices have a single / three-pole automatic reclosing. The starting methods implemented in the distance protection are optimally suited to distinguish safely and highly sensitive between operating and fault conditions under different load conditions and with different types of grids and star point treatments.

The implementation of standard and proprietary protocols allows close collaboration with controlling systems of various manufacturers. All necessary protection and control functions are integrated in the devices.

CONFIGURATION

All functions can be configured separately. By separating protection configuration from control configuration, all different kinds of requirements of different applications can be met.

The protection-specific functions are separately configured or deactivated depending on the respective application. Irrelevant functions are hidden and inactive which allows simple and structured configuration of the devices.

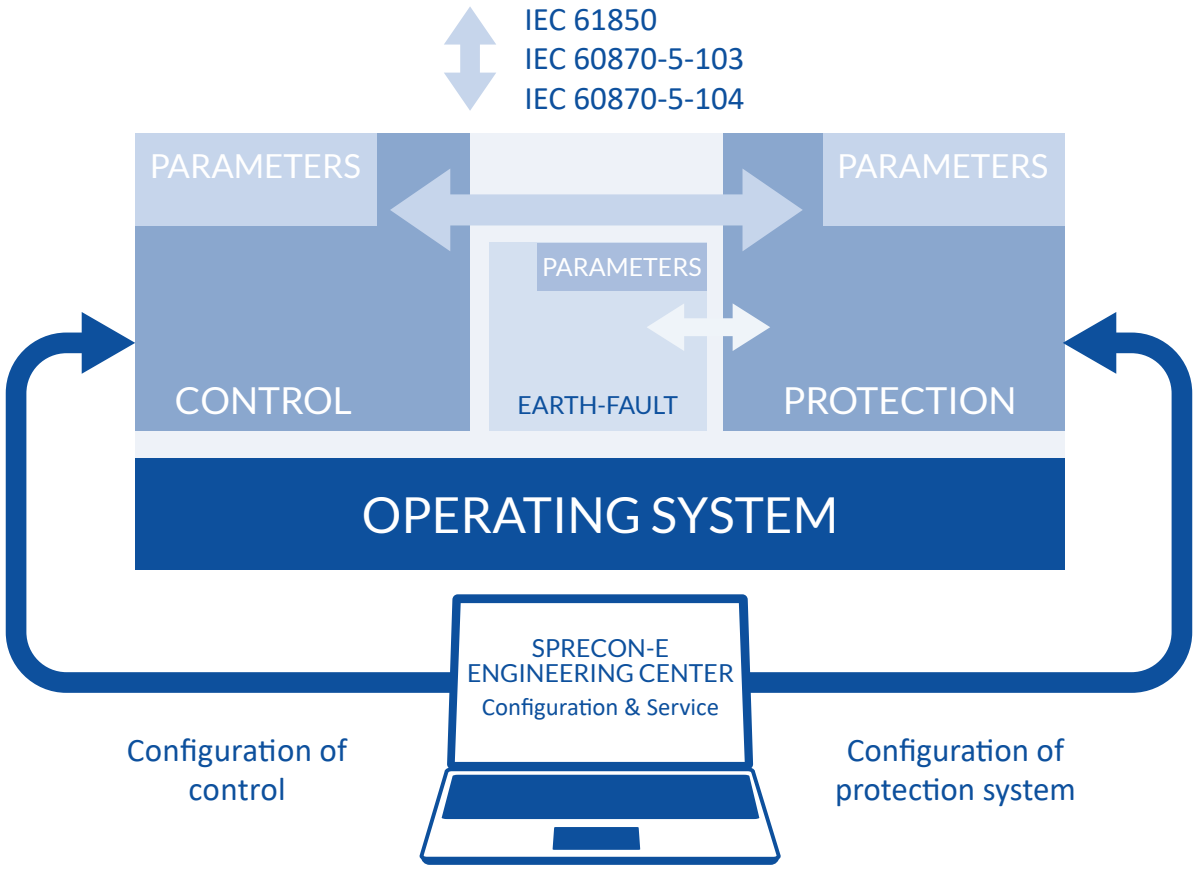
In the control application all configured bays are typeoriented stored in a database. They can be therefore copied and re-used as well as easily re-adapted, which facilitates configuration of large-scale systems.

OPERATING

In order to meet the requirements of efficient system management, all operations can be accomplished with the detachable HMI control panel. Hence, protection configurations can be locally carried out beside usage of the operating program “COMM-3“.

All relevant information about the process and the device is shown on the fully graphical display of the control panel. Additionally, configurable LEDs are available for signalling.

Separated navigation keys allow clear user guidance through the various pages and submenus. Furthermore, they facilitate simple configuration of extensive protection and control functions.



Principle of consequent separation of protection and control

SPRECON-E-P DD..6 – TECHNICAL DATA (EXCERPT)

IMPLEMENTED PROTECTION FUNCTIONS	REFERENCE		TYPE		
	IEEE C37.2	IEC 61850-7-4	DD 6 3x I_L 3x U	DDE 6 3x I_L 1x I_E 3x U	DDEY 6 3x I_L 1x I_E 3x U 1x $U_{NE/Sync}$
Distance protection	21/21N	PDIS	✓	✓	✓
Current starting I>>		(PTOC)	✓	✓	✓
Voltage-depended U-I starting		(PVOC)	✓	✓	✓
Polygonal Z< starting			✓	✓	✓
Distance zones / overreach zones			6 / 1	6 / 1	6 / 1
Direct. backup time / time limit (non direct.)			✓ / ✓	✓ / ✓	✓ / ✓
Short circuit direction detection	67	PTOC, RDIR	✓	✓	✓
Switch on protection (SOTF, SOP)	50	PIOC	✓	✓	✓
Power swing protection	68/68T	RPSB	✓	✓	✓
Auto reclosing (AR), 1-/3-pole	79	RREC	✓	✓	✓
Teleprotection (TP), 1-/3-pole	85	PSCH	✓	✓	✓
Backup and overcurrent protection			✓	✓	✓
I_L> (backup)DT/IDMT, 4 stages	50, 51	PIOC, PTOC	✓	✓	✓
I_E> (backup)DT/IDMT, 4 stages	50N, 51N, 51Ns	PIOC, PTOC	✓	✓	✓
Earth fault & short circuit direction	67N	PTOC, RDIR	✓	✓	✓
Phase-selective earth fault detection	64	PHIZ	✓	✓	✓
Earth fault direction detection	67Ns	PSDE		✓	✓
EDIR – enhanced earth fault direction detection Transient, harmonical, stationary, pulse methods	67Ns		Option	Option	Option
Capture of ext. earth fault direction annunciation		(PTEF, PSDE)	✓	✓	✓
Current annunciation stages (2x $I_{L>an}$, 2x $I_{E>an}$)			✓	✓	✓
dI annunciation stages (2x $I_{L>an}$, 2x $I_{E>an}$)			✓	✓	✓
Inrush restraint		PHAR	✓	✓	✓
Overvoltage time protection (U>, U_{NE}>), 2 stages	59, 59N	PTOV	✓	✓	✓
Undervoltage time protection (U<), 2 stages	27	PTUV	✓	✓	✓
Frequency protection (f<four stages, f>2 stages)	81	PTUF, PTOF	✓	✓	✓
Frequency change protection df/dt 4x falling, 2x rising	81R	PFRC	✓	✓	✓
Directional power protection (P>, Q,>), 2x2 stages	32	PDOP, (PDUP)	✓	✓	✓
Reactive power undervoltage protection (Q-U<)		(PDOP, PTUV)	✓	✓	✓
Under Frequency Load Shedding (UFLS), 10 stages		PTUF, PDOP	✓	✓	✓
Negative sequence protection(2x I_{neg}), 2 stages	46	PTOC	✓	✓	✓
Overload protection for phases or neutral point	49	PTTR	✓	✓	✓
Reclosing lockout	86	PMRI	✓	✓	✓
Circuit breaker failure protection (CBF), 1-/3-pole	50BF	PTOC, RBRF	✓	✓	✓
CB-TRIP by an external signal		(PTRC)	✓	✓	✓
Synchrocheck	25	RSYN			✓
Fault locator (FL)	21FL	RFLO	✓	✓	✓
Phase-sequence reversal / direction			✓	✓	✓
Pulse shaper stage (programmable logic)			✓	✓	✓
Trip circuit supervision	74TC		✓	✓	✓
Parameter sets			4	4	4
Logic + time stages for optocoupler inputs			✓	✓	✓
Virtual digital inputs/control inputs			30/15	30/15	30/15
Logic + operation time for output relays			✓	✓	✓
Measurands, short report			✓	✓	✓
Event logging, non-volatile		RDRE	✓	✓	✓
Disturbance date recording, non-volatile		RADR, RBDR	✓	✓	✓
Statistics			✓	✓	✓
Measurand checks, self supervision			✓	✓	✓
Assistance for testing and commissioning			✓	✓	✓

DIMENSIONS & WEIGHT

- Dimensions: 131/212/436 x 176 x 257 mm (W x H x D) incl. connections
- Weight: < 6 kg

GENERAL FUNCTIONS

- Remote maintenance and configuration
- Time synchronisation (DCF77, GPS, station & remote control)
- Diagnosis via webserver
- AI, AO modules for combined devices available
- CP with a fully graphical display with 3-coloured LEDs
- Automatic backup on SD card
- Redundant power supply (optionally)

COMMUNICATION

- IEC 60870-5-103/-104, IEC 61850
- RS232, RS422/485, fibre-optic, 10/100 Mbit Ethernet
- Ethernet-based protection interface
- 2 additional optical Ethernet interfaces for redundant ring
- Integration of stand-alone devices via station bus (counter, metering devices, protection relays, AVR, Petersen coil controller etc.)

ADDITIONAL PROTECTION FUNCTIONS

- Internal earth fault module EDIR with various earth fault detection methods
- Defeatable phase preference for double earth faults
- Separation of protection event recording from control data
- Nominal current selection (1/5 A) via terminal connection
- Settings via control panel and PC through menu-assisted plain text messaging

CONTROL FUNCTIONS

- Control and monitoring of switching devices and process elements
- Freely programmable logic (PLC)
- Control of transformer tap changers and Petersen coil
- Power output with high breaking capacity (optional)
- Limit value monitoring
- Maximum value calculation (non-return pointer)
- Metered value capturing, operating hours counter, switching operations counter
- ...

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